

# Maternal mortality in Jordan: role of substandard care and delays

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## وفيات الأمهات في الأردن: دور تدني مستوى الرعاية والتأخر في طلب الرعاية

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**الخلاصة:** إن فهم العوامل التي تؤثر أثناء الحمل والولادة والفترة التالية للولادة هي أساس النجاح في الوقاية من وفيات الأمهات. وهدف هذا المسح المقطعي في الأردن للعامين 2007-2008 هو التعرف على تأثير تدني مستوى الرعاية والتأخر في طلب الرعاية على وفيات الأمهات. وقد أجرى الباحثون تقصي استعدياً لجميع وفيات الأمهات بين النساء في عمر 15-49 سنة طوال هذه الفترة (العدد 76) من خلال مراجعة الملفات والمقابلات مع الأسر في جميع المستشفيات (العدد 102) وفي أقسام الطب الشرعي في الأردن؛ وجرى تقييم عناصر تدني مستوى الرعاية، والتأخير على مستوى المستشفى، وفي المنزل، وفي المواصلات. اتضح أن تدني مستوى الرعاية قد ساهم في حدوث 52.6% من الوفيات، وأن التأخر في طلب الرعاية قد ساهم في 55.3% منها، وأن تأخر النقل قد ساهم في 15.8% منها، وأن تأخر الرعاية في المستشفى قد ساهم في 17.1% منها. وأن النساء اللاتي لم يعرفن علامات الخطر في الحمل (نسبة الأرجحية 6.32)، أو اللاتي رفضن التماس المشورة الطبية بإنهاء الحمل لديهن (نسبة الأرجحية 1.78)، أو كان العمر الحاملي هن أقل من 37 أسبوعاً (نسبة الأرجحية 1.85)، والنساء في الأسر الكبيرة العدد كن على الأرجح هن اللاتي تأخرن في طلب الرعاية.

**ABSTRACT** Understanding the factors that operate during pregnancy, delivery and postpartum is the key to success in the prevention of maternal mortality. This cross-sectional survey in Jordan for the years 2007–2008 aimed to identify the role of substandard care and delays in maternal deaths. All maternal deaths among women aged 15–49 years over this period ( $n = 76$ ) were investigated retrospectively through file review and household interviews in all hospitals ( $n = 102$ ) and forensic medicine departments in Jordan; elements of substandard care and delays at hospital, home and transport levels were evaluated. Substandard care accounted for 52.6% of deaths, delay in seeking care 55.3%, delay in transport 15.8% and delay in hospital care 17.1%. Women who did not recognize the danger signs of pregnancy (OR 6.32), refused medical advice to terminate the pregnancy (OR 1.78) or at a gestational age > 37 weeks (OR 1.85) were significantly more likely to delay seeking care, as were those with larger mean family size.

## Mortalité maternelle en Jordanie : rôle de la qualité insuffisante des soins et des retards

**RÉSUMÉ** La compréhension des facteurs entrant en jeu au cours de la grossesse, de l'accouchement et de la période du postpartum est la clé d'une prévention efficace de la mortalité maternelle. La présente enquête transversale menée en Jordanie entre 2007 et 2008 visait à identifier le rôle de la qualité insuffisante des soins et des retards dans les décès maternels. Tous les décès maternels survenus dans le groupe d'âge des 15-49 ans au cours de la période ( $n = 76$ ) ont été étudiés rétrospectivement dans le cadre d'un examen des dossiers et d'un entretien avec les ménages dans tous les hôpitaux ( $n = 102$ ) et les services de médecine légale en Jordanie ; les éléments concernant la qualité insuffisante des soins de et l'origine des retards, c'est-à-dire à l'hôpital, au domicile ou dans les transports, ont été évalués. Les soins de qualité insuffisante représentaient 52,6 % des décès ; les retards dans la recherche de soins comptaient pour 55,3 % ; les retards dus aux transports expliquaient 15,8 % des décès ; et les retards dans les soins hospitaliers participaient pour 17,1 %. Les femmes qui ne reconnaissaient pas les signes de danger pendant leur grossesse (O.R. 6,32), qui refusaient de consulter un médecin pour mettre un terme à leur grossesse (O.R. 1,78) ou qui étaient enceintes de plus de 37 semaines (O.R. 1,85) avaient davantage tendance, et ce de manière significative, à retarder la recherche de soins, tout comme les femmes appartenant à des familles plus nombreuses en moyenne.

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## Introduction

Maternal mortality data reflect the health care status of any given country in general and the efficiency of health care to women in particular [1,2]. Understanding the specific details of responsible factors that operate during pregnancy, delivery and the postpartum are the key to success in the prevention of maternal mortality [3]. Inadequate quality of hospital care and delays at different levels have been linked by many studies to rising maternal mortality rates [4–6]. Delays have been described briefly in a previous national study on maternal mortality in Jordan in 1995, in which delayed obstetric care was present in 68% of cases, delays in seeking care in 62% and delays in transportation in 12% [7]. Other studies in the region have reported on some of the different aspects of delays [8–11].

In Jordan, recent national figures indicated that about 99% of women received some antenatal care during the first trimester of pregnancy from a medical professional and that 74% had 7 or more antenatal care visits. However, only 50% were informed about the symptoms and signs of pregnancy complications during the visits and only 38% were informed about puerperal complications. Almost all of Jordan's births occurred in health facilities, 75% of them were assisted by a doctor and 25% were assisted by a nurse or a midwife; 19% of births were delivered by caesarean section [12].

The data reported here were derived from the Jordan national maternal mortality study for 2007–08 [13]. The initial study described the methods, maternal mortality ratio and causes of death [13]. The present report describes an audit of the avoidable causes of maternal death, focusing on substandard care and delays.

## Methods

### Sample

The original study methodology is described in detail elsewhere [13].

Briefly, the reproductive age mortality survey method was applied. The names of all women in the age range 15–49 years who had died in the period from January 2007 through December 2008 were reviewed. Women in this list were identified with contact information including address, telephone number, place of death and hospital(s). This led to identifying 76 maternal deaths out of a total of 1406 dead women.

### Data collection

All hospitals ( $n = 102$ ) and forensic medicine departments in Jordan were visited in addition to visits to the dead women's households.

A questionnaire was developed to collect data from hospitals. It included items about the personal identification of the deceased woman (name, age, address); date of admission, date and time of death; reproductive history of previous and last pregnancy; chief complaints; narrative section about the sequence of events from admission until death, provisional diagnosis, case management, surgeries; cause of death and autopsy reports, where available. The main source of information was medical files at hospitals and, if necessary, through interviews with attending physicians, midwives and nurses that dealt with the case. Medical staff were asked to give full details about the woman's medical condition from admission to death. In most cases, information were collected through interviews with 2 or more doctors in the same or different hospitals (for those women who were referred from one hospital to another due to lack of expertise, equipment or intensive care units or beds, or for other reasons). Midwives and/or nurses were interviewed for all details around the death event. In addition, clue data on women's lack of awareness of their urgent medical conditions were looked up in medical files (e.g. women delayed hospital visit for hours or days although having complaints of shortness of breath, lower abdominal pain or bleeding).

During home visits a structured questionnaire interview was conducted with the woman's husband, mother or sister. The questionnaire included the following sections: sociodemographic information about the deceased and her family; narrative details of the circumstances of death; last pregnancy history; reproductive history; chronic health problems and medications; utilization and satisfaction with the received health care. Variables for analysis included maternal age, education, gravidity, gestational age, health insurance, prenatal care, family size, family income, distance to nearest hospital, place of residence and awareness of pregnancy danger signs. Identifying women who were unaware of pregnancy danger signs was done using questions to the husband and or family members on whether the dead woman or her family were able to recognize pregnancy danger signs at the time before seeking hospital care (if ever). For the sake of this report, category adjustment for some variables was made (gestational age, family size, family income).

Delay in emergency obstetric care was confirmed when a woman arrived alive at hospital, but initiation of medical care was delayed, which was confirmed by checking the medical files, reports by the medical staff or by the family. Substandard care was defined as inappropriate case management which was recognized by reviewing medical files, interviewing doctors responsible for cases or heads of obstetric departments at each hospital. Deficiencies in facility preparedness reported in the notes or by medical staff or family, such as lack of equipment, specialists or intensive care facilities were considered as substandard care. In some instances hospital delay was counted twice, once as a delay per se, and again as substandard care. Delay in seeking care was identified by asking the family about the time between the onset of complaints and the decision of the woman or her family to seek care. In many cases information about delay

in seeking care were extracted from the medical files. Delay in access to hospital was confirmed by asking the family if there were any transport problems in getting to the nearest hospital.

## Analysis

Data on delays and substandard care were processed and analysed using SPSS software, version 15. Chi-squared and *t*-tests at 95% confidence were applied.

## Results

There were 76 maternal deaths in the years 2007 and 2008 out of 397 588 live births for the same period. The median age of women was 31.0 years and they had a mean family size of 5.5 (SD 2.6). Around two-thirds of them had less than high school education and 60.8% had a monthly family income of < 250 Jordanian dinars (US\$ 352). The main causes of death were haemorrhage and pulmonary embolism.

### Substandard hospital care

Substandard care accounted for 40 (52.6%) of maternal deaths (Table 1). A total of 13 women (17.1%) out of

76 dying were the subject of hospital delays due to delayed initiation of care or sending the women home with reassurance. Substandard management was evident in 16 women (21.1%) and included misdiagnosis and mishandling of postpartum haemorrhage and other obstetric complications. There were 11 maternal deaths (14.5%) in hospitals that were inadequately equipped for emergency obstetric care due to a lack of beds or intensive care, lack of experience or lack of specialists.

### Access problems

We identified 12 women (15.8%) who failed to get transportation in good time; in 6 cases the families reported this was due to financial difficulties, in 4 cases due to living in a remote area far away from regular transport and for 2 women whose symptoms worsened after midnight transport became available only after 30 minutes (Table 1).

### Delay in seeking care

There were 42 women (55.3%) who delayed seeking care for one or more reasons. These were mainly attributed to lack of knowledge about danger signs and refusal of care (Table 1).

Table 2 shows the demographic and pregnancy characteristics of women who delayed versus those who did not. Women who did not recognize the danger signs of pregnancy (OR = 6.32,  $P < 0.001$ ), those who refused medical advice to terminate the pregnancy (OR = 1.85,  $P = 0.008$ ) and those who were at a gestational age > 37 weeks (OR = 1.78,  $P < 0.01$ ) were significantly more likely to delay seeking care. In contrast, women with easy access to obstetric care, and those who resided within a ≤ 10-minute car journey to the nearest hospital were more likely to seek care (OR = 0.50,  $P = 0.006$  and OR = 0.60,  $P = 0.035$  respectively). Women who delayed seeking care had a significantly larger mean family size than those who did not delay seeking care: 5.6 (SD 2.9) versus 5.1 (SD 2.3) ( $P < 0.001$ ).

## Discussion

Compared with the results of a similar study in Jordan in 1995 [7], our results indicate a decrease in delays of obstetric care (17.1% versus 68% of deaths) and delays of seeking care (55.3% versus 62%); however, there was an increase

**Table 1 Details of substandard care and delays for maternal deaths in Jordan, 2007–2008**

Variable	No. of deaths	% ( <i>n</i> = 76)	Reported aspects
Substandard care			
Total	40	52.6	
Case management	16	21.1	Misdiagnosis; mishandling of postpartum haemorrhage; mismanagement of other obstetric complications
Hospital preparedness	11	14.5	Lack of beds or intensive care unit; lack of experience; lack of specialists
Delay in hospital care	13	17.1	After reporting to hospital, women were reassured, sent home and came back dead; delayed initiation of care
Delay in seeking care	42	55.3	Symptoms started 2 hours to 5 days before arrival to hospital; bleeding; headache; severe lower abdominal pain; shortness of breath; cyanosis; hyperemesis; semi-consciousness; dizziness; intrauterine fetal death or postmaturity; refused to go to hospital until collapsed; unsure about the need for hospital care; refused medical procedures and discharged against medical advice; rejected medical pregnancy termination
Delay in transport	12	15.8	Unable to afford transport (6 women); dwelling in remote area and far away from regular transport (4 women); symptoms worsened after midnight and transport found after 30 minutes (2 women)

**Table 2** Demographic, pregnancy and access variables of maternal deaths in women who delayed seeking care ( $n = 42$ ) and those who did not ( $n = 34$ )

Variable	Delay in seeking care <sup>a</sup>		OR (95% CI)	P-value <sup>b</sup>
	Yes	No		
<b>Woman's age (years)</b>			NA	0.828
19–29	17	14		
30–39	16	11		
≥ 40	9	9		
<b>Woman's education</b>			NA	0.303
Illiterate	5	1		
1–12 years	15	11		
> 12 years	8	9		
<b>Residency</b>			1.42 (0.96–2.09)	0.092
Urban	23	25		
Rural	19	9		
<b>Family income (US\$ monthly)</b>			1.36 (0.78–2.38)	0.254
≤ 352	19	12		
≥ 353	9	11		
<b>Gravidity</b>			0.99 (0.63–1.56)	0.969
1–3	15	13		
4–14	20	17		
<b>Pregnancy planned</b>			0.79 (0.50–1.24)	0.360
Yes	23	17		
No	8	3		
<b>Health insurance</b>			1.10 (0.64–1.91)	0.722
Yes	27	22		
No	8	8		
<b>Family size</b>				
Mean (SD)	5.6 (2.9)	5.1 (2.3)		< 0.001
<b>Prenatal care in current pregnancy</b>			0.65 (0.46–0.91)	
Yes	26	19		0.078
No	8	1		
<b>Distance to nearest hospital by car (min)</b>			0.60 (0.37–0.98)	0.035
≤ 10	12	15		
> 10	17	6		
<b>Easy access to hospital</b>			0.50 (0.37–0.67)	0.006
Yes	22	22		
No	9	0		
<b>Gestational age (weeks)</b>			1.78 (1.12–2.82)	0.008
2–37	27	12		
38–43	14	22		
<b>Refused termination of pregnancy</b>			1.85 (1.36–2.52)	
Yes	10	1		0.010
No	32	33		
<b>Unrecognized pregnancy danger symptoms</b>			6.32 (3.02–13.2)	
Yes	36	1		< 0.001
No	6	33		

<sup>a</sup>Numbers may not add to 76 due to missing data; <sup>b</sup>Chi-squared test for binomial and t-test for means. OR = unadjusted odds ratio; CI = confidence interval.; NA = not applicable; SD = standard deviation.



in the rate of transport delays (15.8% versus 12%). This change could not be verified since the data collection approach and results of the 1995 study were not available for review.

Our results indicate serious flaws in diagnosing specific conditions including uterine rupture and concealed postpartum haemorrhage, thrombosis and thromboembolism. The role of better quality in obstetric care has been addressed by many studies on pregnancy complications [14–16]. Evidence-based practice has been acknowledged as a vital modality in enhancing maternal health. Reductions in maternal deaths can only be attained by improving the quality of maternal and obstetric care, in addition to coverage, and will require constant monitoring and assessment with dynamic use of data to guide decisions and actions [3]. In fact, increasing the level of attentiveness for emergencies and capacity to manage common obstetric complications, according to evidence-based practices, has led to increased availability, improved quality and greater use of services and consequently a decline in the case fatality rates of obstetric complications [3,17,18].

The present study indicates that delay in seeking care was a major factor contributing to maternal mortality in Jordan. Lack of awareness of danger signs in pregnancy was a crucial factor. This finding is consistent with other studies about lack of awareness of pregnancy danger signs [19,20]. Socioeconomic status, extended family size, health beliefs, access and level of trust in available local medical care may have affected the decision to seek care. Other studies had reported the notion that different cultures affect women's care-seeking decisions, despite the existence of similar danger signs [14,19–21]. In addition, religious beliefs may have affected the decision of those women who refused pregnancy termination. Furthermore, health education on the warning signs in early pregnancy and

husband's support have been shown to be factors of value in timely decision-making [2,15,16].

An association has been shown between sociodemographic factors and delay in seeking care [1,2,6]. This study did not confirm that, but indicated a significant difference in relation to mean family size between women who delayed seeking care and those who did not. This may be related to inferior health outcomes in larger families with underprivileged life conditions [16]. Women who decide to seek obstetric care may be influenced by their experience during antenatal care visits. This study failed to show a significant statistical difference between having prenatal care and delay in seeking emergency obstetric care. However, previous studies had emphasized the importance of skilled prenatal care in enhancing the utilization of obstetric services [14,15,19].

Easy access to hospitals is a critical issue for women seeking health care [19]. This study indicated that lack of easy access to a health facility, as one of the types of delay, was not related to income. In Jordan, the poverty line was estimated at US\$ 711 *per capita* annually, or US\$ 353 per household monthly. In 2005, this comprised 14.7% of the total population of Jordan [22]. Around 60% of the women in this study were below the poverty line; nevertheless they managed to access their nearest hospital for routine and emergency obstetric care. Difficult access to emergency obstetric care due to lack of transport, paved roads or a nearby hospital have been found to play a major role [23]. Those findings are important in the search for interventions aimed at maternal mortality reduction [18,19].

Our study emphasizes the role of vigilant health care and competent clinical practice in reducing maternal deaths. With the recent advent of minimally invasive treatments and drugs, physicians now have more options at their disposal to diagnose and manage

thromboembolism or temporize bleeding. Evidence-based protocols of practice should be promoted, in addition to emphasis on training, continuous medical education and professional development [3,17,18].

This study suffered a number of limitations. First the retrospective design of data collection from dead women's families and medical staff may have introduced recall bias. To avoid this setback, data collection was carried out in a precise manner for each item. If there were insufficient data, other visits to the sources were performed including all of Jordan's hospitals and forensic departments. In most cases interviews were made with more than one medical staff (doctor, head of department, midwife, nurse) and family member (husband, mother, sister). Careful reviews of data including interviews and files were conducted for each case by the study team, who comprised experts in obstetrics and gynaecology, maternal and child health, public health and biostatistics. In addition, other experts in pathology and obstetrics were consulted. Secondly, in many cases there were difficulties in data collection in hospitals due to lack of an adequate filing system. Thirdly, household visits were difficult due to lack of complete information on the patient's address in medical files. Addresses were identified by checking the civil registry and city records and calling relatives.

Nevertheless, this is the first study in Jordan that has addressed the delays and substandard care of maternal deaths in a reliable manner, and its results should be considered in efforts towards prevention of maternal mortality in the country.

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